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THE TREATMENT OF
VALVULAR DISEASES OF
THE HEART.

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THE
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OF
VALVULAR DISEASES OF THE HEART.¹

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THIS paper is intended to deal with matters connected purely with the treatment of valvular diseases of the heart. In it I desire to record some opinions formed by experience; to trace lines of procedure; to see in how far new therapeutic agents have added to our resources; and to try to make out in what direction the hand of progress points.

Corvisart's famous quotation as a motto for his classical treatise on diseases of the heart, *Hæret lateri lethalis arundo*, represents the thought for a long time prevailing, and still largely adhered to, certainly as regards valvular affections, that nothing can be done for such grave conditions: the fatal arrow must stay implanted until death loosens it. Side by side with this opinion has been, of late years, the doctrine strongly urged that treatment should be based on the particular mischief at valves and valve openings and its supposed necessary consequences on the walls, and rules are laid down for the use or avoidance of remedies in accordance with these preconceived ideas, and with the special name the valvular disease bears. Thus, in mitral regurgitation, as well as, and even more markedly, in mitral narrowing, digitalis is to be employed to increase the propelling power of the heart; in aortic regurgitation, with its large left ventricle, this drug is to be avoided—may be even dangerous; and, as the resulting hypertrophy is mostly sufficient, digitalis is of little or no use in aortic narrowing. In tricuspid

¹ Read before the Association of American Physicians, September 19, 1888.



regurgitation we are taught by some never to omit its use, whatever else we do; by others, that as there is no compensatory muscular change, it is impossible that it can be of any service.

Now, from these doctrines and the suppositions on which they are based, I dissent. I think they only embody half truths, which, rigidly applied, will lead to wrong practice. I believe they ought to be taken simply as very general statements concerning the particular tendency of each valve disease, but not be the guide in an individual case without an accurate study of the special features of that case. I hold, then, that the precise valve affected is not, with our present resources, the keynote to the treatment of valvular heart disease. Much more important is it to regard the state of the muscular fibre; the size of the cavities; the condition of the arteries, veins, and capillary system; the secondary results of the cardiac lesion; the control of the nervous system. Important, too, it is to bear in mind the cause of the malady. Holding these views and largely based on them, I advance these propositions for the management of cases of valvular disease of the heart. We are to take as indications:

1. The state of the heart-muscle and of the cavities.
2. The rhythm of the heart-action.
3. The condition of the arteries and veins and of the capillary system.
4. The probable length of existence of the malady, and its likely cause.
5. The general health.
6. The secondary results of the cardiac affection.

It is on these considerations that the treatment of valvular affections turns, and the first of them is, from a practical point of view, the most important. It influences action in diverse ways. Thus, if we have a case with heart muscle which has increased in size simply to the extent necessary to overcome the difficulty made by the valvular imperfection; in which the cavities are but little stretched; in which a stronger impulse is not associated with marked apex displacement or with greatly increased transverse percussion dulness; in which the arteries do not throb inordinately, nor the veins are turgid, nor the surface mottled and the capillary circulation sluggish; in which there is no dropsy, no respiratory embarrassment; in which the general health is good, and exercise does not produce inordinate distress,—we know that compensation has fairly followed injury, that heart muscle and cavities are in, for that case, healthy condition, and should endeavor to keep them so by simply regulating the patient's life and habits. No matter by what name the valvular disease is labelled, there ought to be no interference with it by drugs, certainly not be remedies which act on the heart.

But the same patient may show excessive cardiac growth and force,

and be greatly benefited by cardiac sedatives; or later he presents a halting beat of the heart, the cardiac dulness has increased, so has the impulse in extent, but not in force; there is œdematous swelling around the ankles; the veins are more prominent; lungs and liver are engorged; small vessels are visible in the skin, and are tardily emptied by pressure;—the stretching, faltering heart calls for support, and is rallied, made regular, and kept for a long time performing its functions admirably, by the persistent employment of moderate doses of digitalis. Yet this is the same patient; all the while the disease bears the same name. But his treatment has been followed by such striking results because the state of the heart muscles and of the cavity has been fully recognized, and been made the basis of remedial interference.

Persons thus supported in their circulation may be kept alive for years and capable of leading useful lives. But this is not the main point I wish to bring out. It is chiefly that the same valvular disease will at different times, according to the varying state of heart muscle and cavity, require very varying treatment. In truth, I have had cases come under my observation in which the active state of the circulation, the marked hypertrophy, the cardiac uneasiness were always greatly relieved by aconite, and so much aggravated by digitalis, which produced a sense of cerebral uneasiness and weight, that the patient had the greatest dread of this drug, even for temporary purposes; yet I have known such cases in time, when the heart began to weaken, owe, for years, their life to the steady use of digitalis.

The class of cases just alluded to, chronic in their course with slowly deteriorating compensation, are, usually, those in which small doses of digitalis act so favorably. The quantity required is, indeed, rarely more than ten drops of the tincture twice daily, kept up until the effect on the heart and pulse becomes perceptible—which may be in a week or in several,—and then suspended, to be resumed according to circumstances. Nay, I have found a single dose of ten drops, repeated once in twenty-four hours, preferably at bedtime, show the same happy results. Some patients do better with five drop doses, every fourth or sixth hour. But the rather larger dose, at longer intervals, is usually the less disturbing plan. Should the digestive organs become deranged, I use digitalis by suppository; from two to four minims of the fluid extract incorporated in cocoa butter are efficient.

Digitalis acts in the cases under consideration chiefly as what is called a heart tonic; it makes the contractions of the cardiac muscle stronger and slower, it produces a fuller flow in the finer vessels. It answers, as already stated, in small or in very moderate doses. It is required in much larger amounts in those instances of valvular disease, comparatively rare, in which there is almost from the first dilatation and all the excessive feebleness of circulation this brings with it; or in which, late

in the history of the valve affection, the dilatation has outstripped the hypertrophy. Under both these circumstances of cardiac weakness, digitalis may be alternated with strychnia and supplemented by alcohol.

There is yet another cardiac condition encountered in valvular disease, in which digitalis is the principal remedy, and in still larger doses. It is where the compensatory hypertrophy is gradually lessening in proportion to the valvular defect; where the venous system is becoming gorged, the breathing much oppressed, the internal organs congested; where the feet are beginning to swell, the pulse is rapid and compressible, and the heart often fitfully excited; it is when the symptoms become rather suddenly aggravated, and a sense of weight and distress in the cardiac region suggests that the organ does not fully empty itself, that larger doses of digitalis will show a wonderful influence. Fifteen minims of the tincture every second or third hour will not only cause the struggling organ to contract powerfully and help the general circulation, but will diminish the choked condition of the cavities, notwithstanding that up to a certain point digitalis prolongs the diastole. The action of the drug is helped by ammonia, by brandy; but while given in these large doses the patient must be kept at rest. The mischief once checked, smaller doses will again show their good effects. We may meet with the condition under discussion in any case of valvular disease; undoubtedly most often in mitral complaints, but also in advanced stages of aortic regurgitation; and, if in the latter affection, we need not be deterred, on theoretical grounds, from withholding the treatment indicated.

In the remarks just made it has been assumed that we are dealing with hearts in which the muscular fibre, however increased, is, on the whole, healthy; in other words, not in a state of degeneration. But supposing that it be; supposing that there be a granular, or a fatty, or a waxy, or a fibroid change. Is the treatment to be altered? I do not think that it can be materially modified except in the rather steadier use of stimulus; yet we will not obtain the same result from digitalis or kindred agents, and arsenic or strychnia is always worthy of trial. These are difficult cases to treat, and difficult cases to recognize. The age; the history, which shows a likelihood of fatty or other degeneration; the aspect of the patient; and the very fact that the heart muscle does not seem to respond to cardiac tonics, give us a clew to the true character of the affection. Neither the sphygmograph nor the cardiograph helps us much in the recognition.

We have been considering heart complaints, and they are the most common, in which sooner or later the compensation is defective, and the heart has to be sustained. But there are cases, already alluded to, in which this never happens, in which no interference is required, in which the patient, if patient he can be called, has a heart quite sufficient for

the ordinary purposes of life. It gives him no uneasiness, and, even if aware of his cardiac malady, its existence ceases to trouble him. These are especially cases of aortic disease, narrowing or regurgitation, particularly the former, with marked, but not excessive hypertrophy. Secondary results of the cardiac affection are not seen; though, as is fully recognized, there is greater tendency to sudden death, and violent exertion must be avoided. Yet I have known persons having these aortic maladies distinguished in pursuits with constant strain; one, an officer of many campaigns; the other, a most laborious physician; the third, the captain of an athletic team at a college proud of its athletic eminence; and not one is aware of being the worse for exertion, suffering neither pain nor shortness of breath. Two have lived over twenty years since I have been cognizant of their malady; they do nothing to counteract its effect, except leading a very temperate life.

Yet another class of cases presents excessive muscular growth, and cavities that have but moderately increased. This state is more often met with in aortic affections, particularly regurgitation; but it may also happen in mitral regurgitation, with or without coexisting aortic disease. The impulse is extended, forcible, and forcible out of proportion to the cardiac percussion dulness; there is often throbbing of the vessels of the neck, dull headache, tension in the pulse, and a feeling of constriction in the chest. Aconite is preëminently the remedy; it diminishes the blood pressure in the arterial system and gives great relief. I usually employ two drops of the tincture, every fourth or sixth hour, for the first few days of the treatment, and then only twice a day; or give one drop every third hour until an effect on the force of impulse and pulse is produced, and keep up this effect with a drop dose, two or three times a day, for several weeks, intermitting the treatment, and resuming it from time to time. *Veratrum viride* has similar applicability; it is, however, more apt to nauseate. But I have often had the happiest results from a combination of one-drop doses of aconite tincture with three of tincture of *veratrum viride*, and seven of tincture of ginger. It is an admirable sedative, and does not sicken.

Summing up, then, the treatment of valvular affections of the heart as they present themselves ordinarily, and basing it chiefly on the condition of the cardiac muscle and of the cavities, we find practically three groups:

Cases in which no special treatment is required.

Cases in which excessive growth and strong action call for aconite or *veratrum viride*.

Cases in which, either early or late, and with or without increased muscle, the heart falters and needs support, and for which *digitalis*, used differently according to varying indications, is the principal remedy.

This line of treatment is held to independently of the exact valve

affection. It requires tact and experience to adjust it to the individual case. But when adjusted, the results are excellent.

I turn now to the other points laid down at the beginning of this paper, which are to guide our therapeutics. They will not long detain us; for they are of far less importance than the one just considered. The rhythm of the heart, its regularity or irregularity, has, indeed, been already alluded to in connection with the state of the cardiac muscle and cavities. Still there are cases, especially of mitral narrowing, in which the extreme irregularity presents a striking feature, and in which the question naturally arises, whether we cannot do something special to remedy so threatening a condition. They are mostly cases with imperfect or weakening compensation, and, therefore, to be benefited by digitalis and remedies of that class. Yet, as an adjunct to this treatment, belladonna may be advantageously employed, and pushed to its constitutional effect. From belladonna alone I have not seen any marked results as a cardiac tonic; but, without depending entirely on it, I know it to be valuable for the relief of irregular action.

The condition of the arteries and veins and of the capillary system furnishes an indication for treatment which is apt to be overlooked. Attention is paid to the veins and to their turgescence in instances of dilated right heart and cardiac dropsy. But there is the equally important state of the arteries, of the arterioles and capillaries, and the appearance of the skin and the network of fine vessels in it, by which we can judge of the more minute circulation. Now, we must remember that the very remedy we use most in cardiac disease, digitalis, contracts the arteries and arterioles, and the indications are often to get with increased cardiac power a free flow in the vessels without resistance from them. No remedy does this; and a certain remedy of the kind is greatly needed. It is claimed that strophanthus has this valuable property, that it is a cardiac tonic which does not also contract the bloodvessels; but this is not proved—indeed, recent researches, such as those of Bahadurji,¹ suggest the contrary. Still, the evidence is in favor of strophanthus contracting the vessels to a much less degree than digitalis. Nitroglycerine and the nitrites produce rapid and great dilatation of the vessels, but have, I think, very little effect on the muscular power of the heart. Belladonna and atropia in decided doses have somewhat the same action as nitroglycerine, less on the vessels, rather more on the heart. Why

¹ British Medical Journal, Sept. 1887; also comments on his researches by H. C. Wood (Therapeutics, seventh edition, 1888.) Lauder Brunton (Pharmacology, third edition, 1888) speaks of strophanthus as not producing "so marked a contraction" of arterioles as digitalis. Purdy's observations (Chicago Med. Journ. and Exam., March, 1887) lead him to the conclusion that strophanthus acts only in large doses upon the vessels. Zerner and A. Löw (Wien. med. Wochenschr., xxx. 36-40, 1887) give many pulse-tracings and arrive at much the same results as those originally published by Fraser. They found strophanthus to cause a more energetic systole and longer diastole, without producing contraction of vessels. The whole subject needs further investigation.

can we not learn to combine nitroglycerine or atropia with digitalis in right proportions, and obtain, where we so wish it, full cardiac power without resisting vessels?

There is, I am certain, a rich field here for accurate research. While waiting for an agent which by itself has the needed qualities, we can use the remedies we possess to modify each other; and in the class of cases with sluggish capillary circulation we may also make use of gentle massage.

The probable length of existence of the malady and its likely cause must be taken into account in treatment; the former, because it gives us an idea how actively the process of compensatory hypertrophy is going on, and whether it had better be stimulated or checked. Besides, it bears on the point whether the original malady is so far off that it is still worth while treating. In this respect, then, the consideration of the duration and of the cause of the valvular lesion merges.

Now, let us consider this question of cause. It is needless to repeat all the possible causes of valvular mischief; the most prominent certainly is rheumatism, next come the degenerative changes, as of advancing years, of Bright's disease. When rheumatic, can we treat it specially? My experience says distinctly not. We possess no remedies to influence the results of the rheumatic endocarditis, when the acute stage is fairly over. Indeed, if it be three months after the attack, I believe the attempt useless. Before this, it may be worth while to try a course of iodides, of blisters, of rest. It will generally fail; but I have twice seen loud murmurs, left after rheumatism, thus disappear, and, I believe, the valve restored. When the attack dates some time back, no good results come from attempts at absorption. I have several times watched the effects of long-continued, faithfully carried out trials. One, in the person of a middle-aged physician who was determined to get rid of a rheumatic mitral disease with a marked systolic apex murmur, and no signs of pulmonary congestion. He kept himself saturated with iodides for a year, only stopping for short intervals, when sickened by the drug. At the end of a year the murmur was just as distinct as before, and his general health certainly not so good; the extent of hypertrophy appeared unchanged. I watched a similar case for eleven months; the result was the same. Yet it is well in instances which have clearly a rheumatic origin, to guard against the possibility of the recurrence of the rheumatism, since this may lead to an aggravation of the valve mischief; it is well at the first sign of a rheumatic outbreak to insist on rest and to administer freely alkalies, or the salicylates. At all times, too, ought the food, the clothing, and life generally, to be regulated as it would be in any one liable to rheumatism. The same line of thought, though not with exactly the same agents, will

indicate to us how to manage the heart disease of the gouty, with the occasional appearance of large quantities of lithic acid in the urine.

With reference to atheromatous disease, with its pulse so often of higher tension than the cardiac condition would indicate, we can, with our present knowledge, do nothing for the gradual decay which is going on. Acids have been suggested, but acids will not answer. Doubtless, future therapeutics will include solvents and other means to influence degenerative states, and they will be used in cardiac affections. Viewed now, we can only say that this kind of cases requires a more constant though varied, cardiac support than the recognizable organic mischief calls for.

There is, however, a form of valvular affection of the heart in which we can treat the malady according to its cause with the happiest results; it is the form which I have called functional valvular disorder. Since the publication of my paper on the subject,¹ I have had many more cases of it, and have learned to remedy the perverted valve action and its consequences in a number of instances which at first appeared to be incurable organic valvular disease. This was accomplished by rest, followed by graduated exercise, by careful diet, and by the persistent use of small doses of digitalis, or, in some later cases, of adonidine. The cases were chiefly mitral regurgitant affections; two of them distinctly followed heart strain from excessive rowing. They were not in any sense anæmic. In two in which the treatment was concluded within the last year, and one of which had considerable pulmonary engorgement, the valve has so completely returned to its normal action that no murmur could be detected by experts who saw them subsequently.

It seems almost needless to speak of attention to the general health, as an indication for treatment, were it not that some important considerations are involved. In the first place, it is evident that the better state we keep the blood in, the better the heart muscle will be nourished, the less likely to undergo degeneration. This is, perhaps, the reason why iron is so often thought of as a routine practice in valvular affections. Yet it is, as a rule, not a good remedy; it constipates, produces headache, a full feeling about the heart, and is badly digested. It ought only to be given in cases clearly anæmic, or after recovery from an acute malady. Food is generally much more important than iron. It should be nutritious, easily assimilated, but never taken in large quantities at a time. Strong broths, fish, eggs, meats, poultry and game, and such green vegetables and fruit as are readily digested must form the basis of the food-supply; and those who like milk, or have no distaste for digested milk, can take either in moderate amounts to advantage. There is no

¹ AMERICAN JOURNAL OF THE MEDICAL SCIENCES, July, 1869.

objection to the use of coffee and tea if not excessive, and small quantities of alcoholic drinks are rather beneficial than otherwise in inadequate or faltering compensation. Except for gummy persons, we may hold to the axiom, that it is quite right to allow alcohol in cases to which we think digitalis applicable. The light wines are well borne and apt to be of service. Champagne is bad for most patients. I have known even a single glass produce violent palpitation, cardiac distress, and oppression. The dress should be loose-fitting and warm; and, owing to the readiness with which laryngeal and bronchial catarrhs arise, exposure to cold and damp should be avoided.

With reference to exercise, it is difficult to lay down rules. Of course, all violent exercise, like all sudden efforts, is to be avoided; and, in the cases with rapid circulation, I believe in considerable repose. But where the heart is not acting too violently, nor too rapidly, there is no doubt that regulated muscular exercise, especially on foot, is of use, as it sustains the nutrition of the organ. It must be kept within the limits of not producing shortness of breath, and ought not to be undertaken in the face of a strong wind. Of the hill-climbing and mountain-climbing plan of treatment, recently advocated by Oertel, I have had no experience. What I have seen of the difficulty people with valvular heart affections have in living in mountainous regions, as in Colorado, does not incline me favorably to the plan. Keeping the nervous system as quiet as possible and being cheerful, are undoubtedly great aids in holding the cardiac malady at bay. Nervous people with valvular disease do badly; their excitement tells on the heart. Worry is even worse. Absence of worry means generally long life; worry, short life.

The sixth condition I laid down for the treatment of valvular disease relates to the secondary results of the cardiac affection. With these it may be proper to consider some special heart symptoms which are at times of unusual prominence. But the attacks of palpitation and cardiac pain; the tendency to syncope; the dyspnoea; the dropsies; the affection of the kidneys; the headache and vertigo; the insomnia; the plugs that are washed into brain, or lung, or spleen, or liver; the hepatic engorgement; the catarrhal affections of stomach and upper bowel, furnish so many morbid states that it would be impossible here to consider them, or their management. I will only select for discussion a few, and try to make clear some points which I have learned by experience.

As regards palpitation in cases in which it is marked, we are often met by this difficulty, that it gives a fictitious strength to the impulse. We ask ourselves, whether it would not be better to treat such cases by sedatives? Yet the pulse, though rapid, does not correspond in strength

the heart is really weak, laboring; and we shall rarely be wrong in meeting the symptoms with ammonia, with brandy, and with similar agents. Then we notice a class of cases in which palpitation is not uncommon, but in which the action of the heart is sometimes rapid, at other times slow, and is very much influenced by the least fatigue. This may happen after some illness, other than cardiac, or after mental anxiety. There is a functional cardiac disorder, superadded to the organic malady, which may, indeed, show fair compensation, and really be but slight. Great attention to the general health, with rest, will get rid of the added marked functional disturbance; and occasional doses of bromide added to digitalis, if this be not otherwise contra-indicated, a course of cannabis indica, or of arsenic, will show good results. From opium, too, given in small amounts, we are apt to observe a happy influence.

In yet another class of cases we have a constant sense of cardiac uneasiness or actual pain as a striking symptom. In such the iodides usually do good, also wearing a plaster over the heart. It may be that plasters, as Lander Brunton suggests, act simply by pressure; but, at all events, they act. In instances in which there is decided force to the impulse, I often order acouite plasters, of half strength; in other instances, belladonna plasters; and the relief they give makes the patients very willing to repeat them. But the best of all remedies is nitro-glycerine. It is most unfortunate that this valuable agent, which lessens blood pressure and diminishes the resistance the heart has to overcome, and which, therefore, ought to have so large a field of usefulness in valvular disease of the heart, is so repugnant to many patients, and produces headache so readily that it has to be discontinued. Yet those who can take it reap the benefit. I have refrained from quoting cases in detail, but I cannot forego citing two striking instances of its favorable use, and in one of long continuance of its administration.

Mr. A., seventy-one years of age, was obliged to retire from the management of a large business on account of shortness of breath and constant dull pain in the cardiac region. He was also much annoyed by dyspeptic symptoms. He presented a mitral incompetency with only slight compensatory hypertrophy; indeed, the impulse was not strong. He had used many remedies, and did not tolerate digitalis well on account of its disturbing the stomach. Drop doses of nitro-glycerine, increased to two drops three times a day, removed in a few weeks the cardiac pain, stopped the intermittent action of the heart, and did the dyspnoea more good than anything else. He was able to resume his occupation, reverting to the remedy as he thought he needed it.

Mrs. E., fifty-five years of age, had a terrible record with reference to disease of the heart. Her grandfather and father had both been extremely gouty, and there was reason to think had had disease of the heart. Two sisters had died of valvular disease. She herself had had

*a one
per cent
solution
of*

swollen feet when a young woman, and other evidences of gout. But these subsided; and, as years passed by, the large joints and the muscles troubled her, and she looked upon herself as rheumatic rather than as gouty. Yet she never had an acute attack of rheumatism. She was fond of travelling, and I did not see her at times for long periods. But five years before her death I am certain that she had no cardiac malady: for, knowing the history of the family, I examined her with reference to this point. She went to Europe two years subsequently, and about that time began to notice that she could not go up hill without panting.

While at Homburg, about eighteen months before her return home, she had an attack of angina, for which nitro-glycerine was ordered, with relief. A subsequent and more severe seizure six months afterward at a railroad station, after some exertion, caused her to take the remedy regularly; and she soon learned that, if she persisted in its use, she had neither attacks of angina nor the steady cardiac pain from which she suffered. She kept on with the medicine, in the shape of tablets of $\frac{1}{16}$ th of a grain, twice daily, rarely oftener, for a year, stopping it only for short periods. She had mitral regurgitation with very moderate hypertrophy; tendency to pulmonary congestion and to bronchial catarrh, scanty urine with some albumen, never exceeding one-fourth of the fluid in the test tube, sleeplessness, and swelling of hands and feet. The heart was made more regular, and the dropsy speedily relieved by digitalis and acetate of potassium. Indeed, it was kept away by this, with the occasional substitution of caffeine. Under these remedies alone, however, the cardiac pain began to return; toward the close the weakening heart had to be sustained by the free use of brandy. For her oppression and miserable nights, dry cupping and Hoffmann's anodyne proved at first of service; she had, finally, to take full doses of morphia. The tablets of nitro-glycerine were not abandoned until near the end. She died comatose.

One of the most important of the secondary results of the cardiac malady is the diminution of the quantity of the urine. Not nearly enough attention is paid to this point, and, unless the urine be abundant, it is not thought to be of any service to take its state particularly into account; yet it is very valuable to do so. Scanty urine, often of higher specific gravity than normal and full of urates, will go hand in hand with cardiac pains, with headache, and with dyspnoea. It is well known that the shortness of breath in valvular disease does not always resolve an adequate explanation in the physical condition of the lungs. The explanation may be partly found in the concentrated condition of the urine, and, very likely, in some of its retained elements producing the disturbance in the capillaries of the lung or the respiratory centre. At all events, from a practical point of view, we observe that diuretics, in the condition alluded to, are most valuable in relieving the pulmonary distress and the other symptoms. Of great service is caffeine, than which, indeed, there is no better diuretic in cardiac cases, especially those with weak heart and concentrated urine, and which, also, up to a certain point has the properties of digitalis as a cardiac tonic. The dose

generally sufficient is two grains of the citrate given every third hour ; but it may be given in five grain doses, or more. Caffeine itself is advantageously administered, as was, I think, first suggested by Tanret, in combination with benzoate of sodium in solution. I have found a grain of each of these drugs mixed with syrup of orange flowers, or of orange-peel, and water, each half a drachm, a good formula. Some of the new salts which are very soluble, such as the cinnamate or the phthalate, are also easily given. The former of these, as the sodio-cinnamate, contains sixty-two per cent. of caffeine; the latter fifty-six per cent., and is soluble in five parts of water. Both are adapted to hypodermic use; so is the sodio-salicylate.

Dyspeptic symptoms, due to a catarrhal condition of the stomach and bowel, are very common in valvular diseases, especially in those of the mitral and tricuspid valves. They may or may not be associated with an engorged, torpid liver; they may or may not be in the form of painful digestion. In either case the failing appetite is apt to be treated by tonics, often by iron. These are not, in my judgment, the right remedies. I believe purgatives are; they strike directly at the morbid state, and subsequently some bitter, or small doses of *nux vomica*, will restore the desire for food. Purgatives are not given as often as they ought to be in valvular disease of the heart. There is the fear of weakening the patient; which they do not, if not abused. They not only remedy the stagnation in the portal circle and remove the catarrhal condition, but they lessen the liability to dropsy. The old treatment of an occasional mercurial was good treatment; and calomel may be beneficial in other ways in disease of the heart, especially those with dropsical tendencies, than through its diuretic action, which is now receiving so much attention.

It is impossible in examining the treatment of diseases of the heart, whether of the disease itself or of its consequences, not to be struck with the important part *digitalis* plays. And the question naturally arises, whether any of the newer remedies can take its place? I have tried them all, and I believe there is not one which is as trustworthy, as valuable; not one is at the same time so good a cardiac tonic and a diuretic. But undoubtedly *digitalis* cannot be kept up uninterruptedly, and it is apt to produce, after a time, derangement of the digestive organs. Some cannot take it at all; and as in any form of tonic, so with this cardiac tonic, we get better results by occasional change. I hold caffeine, *strophanthus*, and *adonidine* to be the best substitutes. I have already spoken of caffeine. From *adonidine* I have witnessed, in one-tenth to one-fifth of a grain doses three times a day, some admirable results; but more in cases of functional than of valvular disease of the heart. Yet even here I have known it to act as an excellent heart

regulator. So does *strophanthus*, which I have, moreover, often seen strikingly influence irregularity, and dyspnoea. Its action is very rapid, but not so permanent as that of *digitalis*, and though much is claimed for it as a diuretic, its influence in this respect is inferior both to *digitalis* and to *caffeine*. It would seem specially applicable to cases with defective power and high arterial tension, as sometimes met with in the heart lesions of Bright's disease; but from actual experience I am not yet certain on this point. *Convallaria* has, on the whole, disappointed me in the treatment of valvular disease, though I think it is of value in palpitation of the heart and in other forms of functional disorder. Cocaine answers very well in some cases; it is certainly both a cardiac stimulant and tonic and not devoid of diuretic powers.

A remedy which I am using now a great deal is chloride of barium. Since I became acquainted, through the investigations of Boehm and of Bartholow, with its physiological action and learned that in this it resembles *digitalis*, I have prescribed it repeatedly in valvular affections. I find it both a general tonic and a cardiac tonic, a remedy that increases the tone in the bloodvessels, a fairly good diuretic, and one that can be taken for a long time without disordering the stomach. It may be even, as Kobert¹ shows, administered hypodermically. The dose in which I have given it by the mouth is one-tenth of a grain in pill, three or four times daily; a rather larger dose is, however, admissible. In very decided amounts it is apt to produce diarrhoea. As Bartholow points out, it has many incompatibles, and it is best not to give it in combination. Among its properties I have noted that it lessens cardiac pain. I learned this from the case of an elderly gentleman with a mitral lesion, regurgitation with some narrowing and defective compensation, in whose case pain or constant cardiac uneasiness was a prominent feature. *Digitalis* did him in this respect no good and was losing its effect in steadying the irregular heart. Chloride of barium in one-tenth of a grain doses improved him greatly; the oppression was relieved, the heart became more regular, the cardiac distress disappeared. He has been more than once benefited for a long time by a three weeks' course of the remedy.

I must not bring this paper to a conclusion without mentioning a point of which I know the great value,—to make periodical examination of persons affected with valvular disease. I am not speaking of those in whom serious symptoms call for constant supervision; rather of those who, under our advice, take little or no medicine. In them, too, it is true that the heart of to-day may not be the heart of a month hence. Yet they are the ones chiefly in whom beginning changes can

¹ Therapeutic Gazette, June, 1887.

be most readily met, and whose lives, with the aid of treatment when necessary, can be greatly prolonged. Let them be made aware of the importance of skilled supervision. It will not mean needless interference; it will mean judgment as to when interference is really helpful. In valvular disease, as in other instances of disease of the heart, advance in knowledge is demonstrating how the arrow in the side can be kept from being fatal.

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